

REMARKS/ARGUMENTS

Claims 7-21, 24, 27 and 29 have been canceled without prejudice. Claims 1, 22, 23, 25, 26 and 28 have been amended. In particular, claim 1 has been amended to incorporate the subject matter of dependent Claim 21 and to additionally recite “wherein the second reactor structural component is dimensioned to have a first diameter” and “the second reflector includes a dimension exceeding one half the first diameter of the second reactor structural component” as clearly shown by Figures 5 and 12 of the application as originally filed.

Claim 23 has been amended to incorporate the subject matter of dependent Claim 24, and to additionally recite “wherein the interior space is dimensioned to provide a first distance separating the material gas supply passage and the moisture outlet passage” and that the “reflector is a thick plate... wherein the plate has a thickness exceeding one half of the first distance” as clearly shown by Figure 6 of the application as originally filed.

Claim 26 has been amended to incorporate the subject matter of dependent Claim 27 and to additionally recite “wherein the interior space is dimensioned to provide a first distance separating the material gas supply passage and the moisture outlet passage” and that the “reflector is a thick plate... wherein the plate has a thickness exceeding one half of the first distance” as clearly shown by Figure 6 of the application as originally filed.

Claim 28 has been rewritten in independent form incorporating the subject matter of base Claim 26, and to additionally recite “wherein the second reactor structural component is dimensioned to have a first diameter” and “the second reflector includes a dimension exceeding one half the first diameter of the second reactor structural component” as clearly shown by Figures 5 and 12 of the application as originally filed.

Claim 22 has been amended to depend upon Claim 1, and Claim 25 has been amended to depend upon Claim 23.

The present amendment adds no new matter to the application.

The Invention

The present invention pertains generally to the field of generating and feeding water from a catalytic reaction involving hydrogen and oxygen, wherein the moisture generated is used in the production of semiconductors. More particularly, the present invention pertains to an apparatus for generating and feeding moisture that includes: (a) a reactor having an upstream gas inlet side, a downstream moisture outlet side and a catalyst for generating moisture from hydrogen and oxygen; (b) means for reducing pressure provided on the downstream side of the reactor, and disposed so that moisture leaving and fed from said reactor is reduced in pressure by the means for reducing pressure while an internal high pressure in the reactor is maintained, wherein the means for reducing pressure comprises one or more components selected from the group consisting of an orifice, a valve, a capillary and a filter; (c) a second reactor structural component, dimensioned to have a first diameter, and a first reactor structural component; and (d) a process chamber, wherein the reactor is connected to feed moisture gas to the process chamber, wherein the moisture gas fed into the process chamber is reduced in pressure by the means for reducing pressure.

In certain embodiments of the present invention, such as those recited in claims 1 and 28, the apparatus for generating and feeding moisture includes a first reflector and a second reflector, wherein each reflector includes a “peripheral portion inclined in cross-

section, and the second reflector includes a dimension exceeding one half the diameter of the second reactor structural component.”

In other embodiments of the present invention, such as those recited in claims 23 and 26, the first reactor structural component and the second reactor structural component are mated to form a reactor shell having an interior space, wherein the interior space is dimensioned to provide a first distance separating a material gas supply passage and a moisture outlet passage, and a first reflector is disposed in the interior space “wherein the first reflector is a thick plate that includes a peripheral portion inclined in cross-section” and has “a thickness exceeding one-half of the first distance.”

Various other embodiments of the presently claimed invention are recited in the dependant claims. The various embodiments, in accordance with the presently claimed invention, share many advantages over the prior art moisture generating apparatuses. Specifically, having “means for reducing pressure,” such as recited in claims 1, 23, 26 and 28, on the downstream of the moisture outlet side of the reactor of an apparatus for generating and feeding moisture serves to maintain the internal pressure of the reactor for generating moisture while ensuring a reduced pressure of the moisture gas in the process chamber connected to the reactor. In this way, the apparatus, in accordance with the present invention, for generating and feeding moisture can react hydrogen and oxygen in a reactor to generate water while obviating the risk that pressure drops due to moisture leaving the reactor will trigger an explosion.

In addition, the flat plate geometry of the first and second reflectors used in embodiments recited by claims 1 and 28, and the thick plate geometry of the reflector used in embodiments recited by claims 23 and 26, of the invention provide an apparatus for

generating and feeding moisture that can generate moisture at greater rates than if other conventional reflectors were used. More specifically, in those embodiments in accordance with the present invention that include a first reflector and a second reflector, greater rates of moisture generation are observed when the second reactor structural component is dimensioned to have a first diameter and the second reflector includes a dimension exceeding one half the first diameter of the second reactor structural component. In other embodiments in accordance with the present invention, where the apparatus includes a reflector that is a thick plate, improved rates of moisture generation are observed when the interior space is dimensioned to provide a first distance separating the material gas supply passage and the moisture outlet passage and the reflector has a thickness exceeding one half of the first distance.

The Rejections

Claims 23-25 and 27 stand rejected under 35 U.S.C. § 112, second paragraph, as indefinite.

Claims 1 and 21-33 stand rejected under 35 U.S.C. § 102(b) as anticipated by, or in the alternative, as rejected under 35 U.S.C. § 103(a) as unpatentable over, Ohmi et al. (EP 0 878 443, hereafter the Ohmi'443 Document). Claims 1 and 21-33 stand rejected under 35 U.S.C. § 102(b) as anticipated by, or in the alternative, as rejected under 35 U.S.C. § 103(a) as unpatentable over, Ohmi et al. (WO 98/57884, hereafter the WO'884 Document). Claims 1 and 21-33 stand rejected under 35 U.S.C. § 102(e) as anticipated by, or in the alternative, as rejected under 35 U.S.C. § 103(a) as unpatentable over, Minami et al. (U.S. Patent 6,334,962 B1, hereafter the Minami'962 Patent).

Applicants respectfully traverse the rejection and request reconsideration of the present application for the following reasons.

Applicants' Arguments

In view of the present amendment, claims 1, 22, 23, 25, 26, 28 and 30-33 are now in compliance with 35 U.S.C. § 112. In particular, the term “thick,” as recited in claims 23 and 26, is now defined with respect to the “first distance separating the material gas supply passage and the moisture outlet passage” and is a “thickness exceeding one half of the first distance.” Applicants assert that a person of ordinary skill in the art would be able to ascertain the definite scope of the claimed invention in light of the teachings of the present application disclosure. Solomon v. Kimberly-Clark Corp., 55 U.S.P.Q.2d 1279, 1282 (Fed. Cir. 2000).

The Prior Art Rejections

Anticipation requires the presence in a single prior art reference disclosure of each and every element of the claimed invention, arranged as in the claim. Lindemann Maschinenfabrik GMBH v. American Hoist & Derrick, 221 U.S.P.Q. 481, 485 (Fed. Cir. 1984). In the present case, the prior art of record fails to establish anticipation for the following reasons.

The Ohmi'443 Document

The Ohmi'443 Document teaches a “method for generating moisture, reactor for generating moisture, method for controlling temperature of reactor for generating

moisture, and method for forming platinum-coated catalyst layer” wherein the temperature of the reactor for generating moisture is set at a high temperature when hydrogen is reacted with oxygen to generate moisture (See Abstract). The Ohmi’443 Document teaches a “gas ignition temperature” of about 620°C for various hydrogen and oxygen mixtures (page 8, lines 55-57). The various embodiments of the reactor (1) are controlled to be 600°C at a maximum, or lower (page 8, line 58), although in the second reactor embodiment (21) taught by Ohmi in Figure 43, water generation is conducted at about 500°C (page 18, lines 54-57) and at 400°C using the water generating reactor of Figure 49 (page 22, line 58, to page 23, line 1).

The reactor embodiments (21) taught in Figures 43 and 49 include gas passage (24a) of the gas supply joint (24), moisture gas passage (25a) of the water and gas take-out joint (25), reactor body members (22), (23), two reflector plates (29a), and a platinum coating film (32) or (41). As shown in Figures 43 and 49, the reflector plates (29a) are hollow, convex structures having a peripheral wall (29d), a bottom surface (29c) and an open hole (29b). In addition, it is noted that the reactor (21) shown in Figure 43 includes a filter (30), (page 18, lines 45-46), and that the reactor (21) shown in Figure 49 includes a filter (30) as well (page 21, lines 31-35).

The Ohmi’443 Document also teaches a separate and distinct reactor embodiment (33) shown in Figure 44, which includes an unlabeled supply passage, an unlabeled take-out passage, a conical filter (35) that is inserted into a reactor body member (34a), and a platinum coating film (36), (page 18, line 58, to page 19, line 3).

The Ohmi’443 Document does not teach, or even suggest, a “first reflector” and a “second reflector” that are “identical flat plates” wherein “each include a peripheral

portion inclined in cross-section, and the second reflector includes a dimension exceeding one half the first diameter of the second reactor structural component” as recited in claims 1 and 28 of the present application. Furthermore, the Ohmi’443 Document does not teach, or even suggest, a “reflector” that “is a thick plate... wherein the plate has a thickness exceeding one half of the first distance” where the “first distance” separates the material gas supply passage and the moisture outlet passage as recited in claims 23 and 26 of the present application.

The WO’884 Document

The WO’884 Document teaches a “method for generating water for semiconductor production” and is the priority document for U.S. Patent 6,093,662 to Ohmi et al. (hereafter, the Ohmi’662 Patent). Applicants assert that the concordance between the WO’884 Document and the Ohmi’662 Patent is sufficient to reasonably characterize the teachings of the WO’884 Document based on the teachings of the Ohmi’662 Patent. Therefore, Applicants will characterize the teachings of the Ohmi’662 Patent and assert that the WO’884 Document discloses the same subject matter as the Ohmi’662 Patent and shares the same deficiencies as the Ohmi’662 Patent.

The Ohmi’662 Patent also teaches a “method for generating water for semiconductor production.” As shown in Figure 7, a reactor (1) is connected to semiconductor manufacturing facilities (SM), wherein a filter (F3) and a valve (V7) are disposed between the reactor (1) and the facilities (SM). The reactor (1) can generate approximately 1000 sccm of moisture (col. 7, lines 53-56) and operates at a reaction temperature of approximately 400°C (col. 2, lines 14-20).

In Figure 1, the Ohmi'662 Patent teaches that a reactor (1) can be connected to a moisture reservoir (R) and that a suction regulating valve (SV) connected to a pump (P) can be connected between the reactor (1) and the reservoir (R). In Figure 9, the Ohmi'662 Patent teaches that reactor (1) includes structural components (2), (3); inlet reflector unit (9) and outlet reflector unit (12) that are flat stainless disks having about the same diameter; a filter (10) and a platinum-coated layer (13), (col. 9, lines 56-64).

The Ohmi'662 Patent also does not teach, or even suggest, a "first reflector" and a "second reflector" that are "identical flat plates" wherein "each include a peripheral portion inclined in cross-section, and the second reflector includes a dimension exceeding one half the first diameter of the second reactor structural component" as recited in claims 1 and 28 of the present application. Furthermore, the Ohmi'443 Document does not teach, or even suggest, a "reflector" that "is a thick plate... wherein the plate has a thickness exceeding one half of the first distance" where the "first distance" separates the material gas supply passage and the moisture outlet passage as recited in claims 23 and 26 of the present application.

The Minami'962 Patent

The Minami'962 Patent teaches a "low flow rate moisture supply process" performed by a system diagramed in Figure 1. The system includes a reactor (1) for the generation of moisture that is connected to supply moisture to a semiconductor manufacturing facility (SM). A filter (F3) is connected between the reactor (1) and the facility (SM). As shown in Figure 7, the reactor (1) includes reactor structural components (2), (3); a gas supply joint (4); a moisture gas take-out joint (5); a reflector (9) on the inlet

side; a reflector (12) on the outlet side; a filter (10); and a platinum-coated catalyst layer (13). This reactor (1) produces approximately 1000 sccm of moisture (col. 2, lines 6-12). As shown in Figure 7, the reflectors (9) and (12) are hollow, convex structures having an open hole (unlabeled).

The Minami'962 Patent does not teach, or even suggest, a "first reflector" and a "second reflector" that are "identical flat plates" wherein "each include a peripheral portion inclined in cross-section, and the second reflector includes a dimension exceeding one half the first diameter of the second reactor structural component" as recited in claims 1 and 28 of the present application. Furthermore, the Ohmi'443 Document does not teach, or even suggest, a "reflector" that "is a thick plate... wherein the plate has a thickness exceeding one half of the first distance" where the "first distance" separates the material gas supply passage and the moisture outlet passage as recited in claims 23 and 26 of the present application.

It is plain that none of the prior art cited against the instant claims can properly anticipate the claimed invention because none of these references, by itself, discloses each and every element of the claimed invention, arranged as in the claim. Lindemann Maschinenfabrik GMBH v. American Hoist & Derrick, 221 U.S.P.Q. at 485. More specifically, neither the Ohmi'443 Document, the WO'884 Document, nor the Minami'962 Patent teach, or even suggest, a "first reflector" and a "second reflector" that are "identical flat plates" wherein "each include a peripheral portion inclined in cross-section, and the second reflector includes a dimension exceeding one half the first diameter of the second reactor structural component" as recited in claims 1 and 28; and the "reflector" that "is a thick plate... wherein the plate has a thickness exceeding one half of

the first distance” where the “first distance” separates the material gas supply passage and the moisture outlet passage as recited in claims 23 and 26 of the present application.

Furthermore, no combination of the prior art references described above can render the subject matter of the claims obvious for the same reasons.

Conclusion

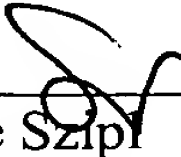
None of the prior art references discussed above, either singly or in combination, can either anticipate or render obvious the subject matter of the claims because none of the references teaches, or even suggests, a “first reflector” and a “second reflector” that are “identical flat plates” wherein “each include a peripheral portion inclined in cross-section, and the second reflector includes a dimension exceeding one half the first diameter of the second reactor structural component” as recited in claims 1 and 28; and the “reflector” that “is a thick plate... wherein the plate has a thickness exceeding one half of the first distance” where the “first distance” separates the material gas supply passage and the moisture outlet passage as recited in claims 23 and 26 of the present application. Consequently, the present rejections standing against the instant claims are untenable and should be withdrawn.

For all of the above reasons, claims 1, 22, 23, 25, 26, 28 and 30-33 are in condition for allowance, and a prompt notice of allowance is earnestly solicited.

Questions are welcomed by the below signed attorney of record for the Applicants.

Respectfully submitted,

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